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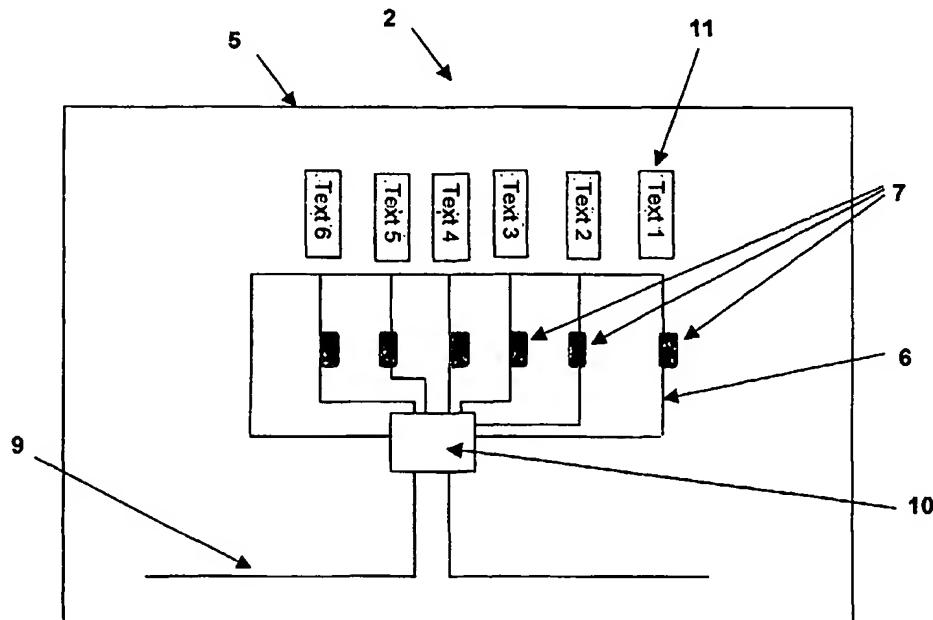
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[Continued on next page]

(54) Title: A DATA INPUT DEVICE



(57) Abstract: A portable data input device (2) comprises a substrate (5) having electrical circuit portions (7) which can be broken by a user to enable information to be input onto the device. The information represented by the broken circuit portions can then be read using the appropriate reading apparatus. The device (2) might be a chip card, RFID (radio frequency identification) device, magnetic strip device or simple printed voucher, and can include text legends (11) printed on the device to indicate a number of choices to the user.

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## A DATA INPUT DEVICE

This invention relates to a device for inputting information, comprising a portable device such as, for example, a printed voucher, Radio Frequency IDentification (RFID) tag, or chip card. The user is able to customise the device in order to enter information. The invention further relates to a method and apparatus for reading the information input onto the device by the user.

Common types of portable information carrier devices include chip cards (including smart cards), RFID tags, magnetic strip cards or simple printed vouchers. All these devices can be used to store information in relation to any number of different areas such as travel arrangements, bank accounts, personal identification, telephone details, theft prevention (article surveillance systems), vehicle identification, baggage tagging, product tracking, among many others.

Of these, the simplest devices are vouchers (such as of card or paper), upon which information is printed either in the form of words or other representation (for example a barcode).

In another type of device, a magnetic strip device, data is stored within a thin layer of magnetic material on the device, and can only be read or written using specialist magnetic scanning or writing equipment.

Chip cards typically comprise a substrate with an embedded IC (integrated circuit) chip having the capability to store information. They may be read-only or read-write depending upon the type of memory, and may include a microprocessor (such as in a smart card) which provides processing power allowing much greater security and storage capabilities than a simple memory chip card. Stored information is retrieved using a suitable reader apparatus when either in direct contact with the relevant part of the card, or using other types of interface including radio frequency (RF) transmission (as described below), inductive or infra-red communication.

In RFID (Radio Frequency IDentification) technology, systems communicate by radio frequency transmission. Reader apparatus includes a receiving / transmitting antenna which will interrogate a RF tag by emitting a RF carrier signal. Once the tag is within the field of this signal, the tag (known as a transponder) will absorb the electromagnetic energy and respond by transmitting a response according to the data stored on the tag. The transponder will therefore also typically include RF receiving / transmission antenna and an IC chip with memory. The transponder may have either

read only or read-write capability, and can vary in processing power depending upon the microprocessor within the IC chip. Some RF tags even include their own battery power source for independent transmission. In a simple form, an RF tag might comprise just a resonant circuit having a tuned coil and diode arrangement, or arrangements such as  
5 are described in United States patents Nos. US 3967161 and US 3810147.

With the devices discussed above, it is not possible for the user to customise the device in order to input information which may be read by a system automatically, without taking the device to the appropriate specialist read/write terminal to change the data within it. In many cases this is desirable as it prevents tampering of the information  
10 on the device by a user. However, in other cases it would be useful for the user to be able to input additional data by hand after receiving the device, which is not possible with the prior art devices. As an example, consider the case of travel tickets which might be issued as chip cards with the travel details stored thereon. It would be convenient for the user to be able to input extra information onto their ticket such as whether they require a  
15 taxi or hire car after their journey, or a particular meal choice during the trip. However, in the prior art systems this information must either be entered in advance so it is pre-stored with the travel details, or alternatively it must be done verbally at the appropriate location at the train station, airport, etc. The present invention seeks to mitigate these disadvantages of the prior art.

20 According to a first aspect of the present invention, there is provided a data input device comprising electrical circuitry having one or more circuit portions arranged such that they are accessible to a user and can be broken by the user so as to store information on the device. The invention advantageously allows a user to input information onto a device by the simple act of manually breaking the relevant circuit  
25 portions, for example this can allow the user to indicate preferences according to text options printed on the device. Conveniently, the breakable circuit portions may be arranged on a substrate of the device so as to be broken by removal from the device by scratching, and may comprise electrically conductive paint, which allows the user to input the information by the simple act of scratching away the conductive paint, using a  
30 coin or the like. Subsequently, the information entered can be transferred into a system (such as a general purpose computer system) by reader apparatus reading the information.

The device may include processing means (such as a CPU chip) which detects the broken circuit portions, and then either stores the information into memory and/or

transmits it to the reader apparatus. Alternatively (or in addition), the reader apparatus may be able to obtain the information by detecting the broken circuit portions itself, for example either through direct electrical contact with the circuitry or by detecting the response (either the presence or absence) of a resonant circuit in an interrogatory RF  
5 field.

The circuitry on the device may further comprise a latch circuit portion arranged to be broken by a user. This can be broken by the user to indicate, for example, that they have finished entering information, i.e. made their final choice. The broken latch circuit portion may be detected first, and until then detection of the other broken circuit portions  
10 (either by the processing means or by the reader apparatus) can be inhibited. This conveniently prevents information being read too early before the user has finished inputting all the information.

The device includes communication means via which reader apparatus can read the information stored on the device which may be by, for example, electrical  
15 contact or electromagnetic transmission. Advantageously, in the case of radio frequency transmission, no line of sight is required between the device and the reader apparatus. The circuitry on the device may comprise a resonant circuit responsive to an electromagnetic field of one or more particular frequencies, the circuitry being arranged such that breaking one of the circuit portions will change the response of the resonant  
20 circuit to a particular frequency. This allows the reader apparatus to detect the response (which may indicate either the presence or absence) of the circuit in an interrogatory RF field, and thereby deduce information which has been input by the user. Conveniently, the resonant circuit is a substantially flat tuned coil and diode arrangement. The breakable circuit portion may form part of the coil itself or may alternatively comprise a  
25 bypass circuit across part of the circuit. In this arrangement, information input by the user breaking the relevant portion of the circuit would be detected by the reader apparatus by virtue of the response of the resonant circuit in the electromagnetic field. Additional resonant circuits responsive to a number of different electromagnetic frequencies may also be provided. These arrangements would be simple to manufacture  
30 and provide an uncomplicated way of indicating to reader apparatus the information that has been input by the user.

The device may alternatively or in addition, be able to communicate with reader apparatus via direct RF transmission of data, for example under the control of a CPU chip on the device transmitting using a small aerial.

The device may alternatively or in addition, be able to communicate with reader apparatus via electrical contact areas, which allow the information on the device to be read by the reader apparatus when in contact with the areas. Reading could take place either by the apparatus being in electrical contact with the circuitry so as to directly  
5 detect the circuit portions which are broken, or alternatively (in the case of a device having a processing chip which can detect the broken circuit portions) by the reader apparatus supplying power to a chip via the electrical contacts, the chip then sending the information back to the reader.

Advantageously, all traces of the information input to the device can be  
10 removed after reading, by the user breaking all remaining circuit portions. This allows the user to enter sensitive information such as a binary PIN (personal identification number) and then safely remove all visible trace of it from the device.

According to a second aspect of the present invention, there is provided an information input system, comprising a data input device as described above, and reader  
15 apparatus arranged for reading information stored on the device by a user breaking on or more of the circuit portions.

According to a third aspect of the present invention, there is provided reader apparatus arranged for reading information stored on a device as described above by a user breaking one or more of the circuit portions, the apparatus comprising means for  
20 detecting which of the circuit portions of the device have been broken.

According to a fourth aspect of the present invention, there is provided a method of reading information stored on a device, the method comprising the step of detecting one or more circuit portions of electrical circuitry on the device which have been broken.

25 According to a fifth aspect of the present invention, there is provided a method of inputting information into a system, comprising the steps of: providing to a user a data input device, the device comprising a substrate and circuitry having one or more circuit portions arranged such that they are accessible to the user and can be broken by the user; inputting information onto the device by the user breaking one or more circuit  
30 portions; and the reader apparatus reading the information input by the user on the device.

The invention is ideally suited to situations in which customisation of a card is required after a user has been presented with it, and does not require the user to place the card in a special terminal to input information. The user is able to input information

immediately and on the move, by simply modifying the circuit portions appropriately. This is particularly suitable, for example in the case of travel tickets which are issued with all the travel details and information already stored on them (perhaps in the form of a magnetic strip storage or as a chip card), and on which the user can then enter further information. For example, text legends on the tickets can be used by the travel operator to present a number of options to the user, such as whether they also require a taxi at the end of their journey, or a selection of meal choices, etc. By simply breaking the relevant circuit portions (e.g. by scratching the paint from the ticket) associated with the options they desire, the user is able to indicate their choice. Subsequently, upon the user commencing their journey, the travel details on the ticket are read and confirmed by machine in the usual way (for example, by magnetic strip scanner). In addition, any further information input by the user having broken the circuit portions can be simultaneously detected by the appropriate apparatus, and sent by the system for processing or to the relevant location (e.g. to order a meal during the journey or arrange car hire at the final destination).

For a better understanding of the present invention, specific embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig.1 shows an information input system according to an embodiment of the invention;

Fig. 2 shows a smart card for use in the information input system of Fig. 1;

Fig. 3 shows a smart card according to a second embodiment of the invention;

Fig. 4 shows a RF tag device according to a third embodiment of the invention;

Fig. 5 shows a RF tag device according to a fourth embodiment of the invention;

Fig. 6 shows a RF tag device according to a fifth embodiment of the invention;  
and

Fig. 7 shows a printed circuit card according to a sixth embodiment of the invention.

The same numerals are used to identify like features throughout the drawings.

Fig. 1 shows an information input system 1 according to an embodiment of the invention. The system 1 comprises a data input device 2 portable by a user 3, and reader apparatus 4 arranged for reading information on the device 2. Reader apparatus 4 communicates with the data input device 2 using transmission of electromagnetic radiation, which in the diagram is shown as a radio frequency (RF) signal. The RF signal

is transmitted from the reader apparatus 4 by aerial 12, which also operates to detect the incoming RF signal from the data input device 2. In this manner, the reader apparatus is able to communicate with and thereby read data on the device 2. Data received by the reader apparatus 4 is sent to any general purpose computer system 32 for further  
5 processing, etc.

Fig. 2 shows in more detail the portable data input device 2 of Fig. 1, which in the embodiment is a smart card 2 with RF communication ability. The smart card comprises a substrate 5 and circuitry 6 having one or more circuit portions 7 arranged to be broken by the user 3. Information input onto the device 2 by the user breaking one or  
10 more of the circuit portions 7 can be read by the reader apparatus 4 as described in more detail below. The smart card 2 includes an aerial 9 connected to an IC (Integrated Circuit) chip 10 which has both a CPU (central processing unit) and memory (not shown). Text legends 11 are printed on the smart card next to the circuitry, illustrating various information choices to the user.

15 The circuitry 6 is connected to the IC chip 10, and includes circuit portions 7 which are areas of electrically conductive paint on the surface of the device 2 which may be removed by a user scratching them, thereby breaking the electrical connection along the relevant circuit portion(s). Each of the text legends 11 is printed on the card so as to be associated with one of the breakable circuit portions 7, thereby indicating to the user  
20 a selection which can be made by breaking that particular portion 7. Upon receipt of the tag 2, the user reads the choices indicated by the text legends 11, and makes his selection by scratching off the appropriate portion or portions 7 of paint. This information which has been input by the user to the card (i.e. the selection choices he has made) can now be read by the reader apparatus 4.

25 A RF carrier signal is transmitted by the aerial 12 of the reader apparatus 4. Upon entering the field of this transmitted signal, smart card 2 works by absorbing the RF energy via aerial 9, the energy is rectified by at least one diode (not shown) in the chip 10, and powers the chip. Processing within the chip can now take place, detecting which of the conductive portions 7 have been broken, and transmitting this information to  
30 the reader apparatus 4 via aerials 9 and 12. Along with this information, other data stored on the chip is also transmitted as required.

By providing the user with breakable circuit portions 7, an uncomplicated mechanism for data input has been provided. The user is able to customise the smart card to input information by simply scratching away areas of conductive paint using, for



example, a coin. The invention allows the user to immediately input the information required, without requiring them to wait and find a suitable terminal to input the information.

Fig. 3 shows a smart card 30 according to a second embodiment of the invention. Smart card 30 is similar to that shown in Fig. 2, with like numerals indicating like features. Fig. 3 shows the smart card having some of the areas of conductive paint 7 having been removed, leaving non-conductive regions 33 (i.e. broken circuit portions). In addition, smart card 30 includes a further element 34 of printed circuitry, which includes latch circuit portion 35 (an additional area of conductive paint). This additional circuit portion 35 can be broken by the user by scratching the paint after they have finished entering information onto the smart card 30. Accordingly, upon finishing making their selection by removing areas 7 of paint as desired, user then proceeds to break latch circuit portion 35 by scratching off the final area of conductive paint.

Upon powering up the chip 10 in the manner described earlier, the chip will firstly detect whether latch circuit portion 35 has been broken. If the latch circuit portion is still intact, the chip does not proceed to detect whether any other circuit portions have been broken, and simply transmits an indication that the user has not entered any information (i.e. no selection has been made). However, other information stored on the chip may still be transmitted. Alternatively, in the case where the latch circuit portion 35 has been broken then the chip proceeds to detect which other circuit portions 7 have been broken and transmits this information to the reader apparatus 4.

Instead of the user entering an indication of choices according to text legends printed on the card, the user may instead (or in addition) enter a security code onto the card by breaking specific circuit portions in the manner described earlier. For example, a simple PIN (Personal Identification Number) code could be chosen by the user and then entered onto the smart card to identify themselves. Upon entering their choice of PIN, the user proceeds to break the latch circuit portion. When the smart card passes within the proximity of an appropriate reader, the chip is powered, detects the PIN and stores the information and /or transmits the PIN to the reader apparatus. Subsequently, all traces of the PIN can be removed by the user by breaking all remaining circuit portions on the card.

In an alternative embodiment, the smart card may include its own power source, such as a miniature battery (not shown), which allows the PIN, or any other input information, to be immediately read and stored in the memory. After this, all visible

traces of the input information can be immediately removed. The card may further include an indicator (such as an LED) to indicate to the user that the information has been successfully stored.

Fig. 4 shows a RF tag device 40 according to a third embodiment of the invention. Device 40 comprises a plastic substrate 5, and a resonant circuit comprising a substantially flat tuned coil 42 and diode 43. Area of conductive paint 7 makes up one portion of the coil 42, and is arranged to be broken by a user scratching away the paint. When the coil is intact, tag device 40 will indicate its presence in an interrogating RF field in response to a particular RF frequency, and can be detected by the appropriate RF apparatus. The user can choose to remove the area of conductive paint 7, thereby breaking the electrical circuit of the coil, which means that the device 40 will no longer respond to the appropriate RF frequency.

Device 40 may be attached, for example using adhesive or the like, to a printed voucher (not shown) having a barcode, which is presented to a user. As the voucher passes through the appropriate reader (e.g. an optical barcode scanner), the apparatus would also produce a suitable interrogatory RF field to detect the response (or not) of the tuned circuit. Information input by the user breaking (or not breaking) the electrical circuit of the coil will therefore be detected by the corresponding absence (or presence) of a response from the circuit in the interrogatory field. Alternatively, the device 40 could be attached to any other suitable substrate instead of the printed voucher, such as for example a chip card or magnetic strip card. The appropriate apparatus for reading the information on the substrate (for example, the card reader or magnetic strip reader) would additionally include an RF transmitter / receiver to detect the tuned circuit of device 40.

Fig. 5 shows a RF tag device 50 according to a fourth embodiment of the invention. Device 50 comprises a plastic substrate 5, and a resonant circuit comprising tuned coil 52 and diode 43. A conductive shunt (short circuit) 54 is placed across part of the coil 52, and includes an area of conductive paint 7 which can be removed by scratching by a user. When electrical short circuit 54 is broken, by the user removing paint 7, the device 50 will then indicate its presence in an interrogating RF field in response to a particular RF frequency and can be detected by the appropriate RF apparatus.

Device 50 can be attached to any suitable substrate such as a chip card or printed voucher, in a similar manner as described for device 40. When the substrate

passes in the proximity of the appropriate interrogatory RF field, information input onto the device 50 by the user removing (or not removing) the area of paint 7, will be detected by the presence (or absence) of a response from the electrical circuit of coil 52 in the field.

5            Fig. 6 shows a RF tag device 60 according to a fifth embodiment of the invention. Device 60 comprises a plastic substrate 5, and a plurality of resonant electrical circuits of the type used in the device of Fig. 4, each circuit having tuend coil 42 and diode 43. Each coil 42 includes a portion 7 arranged to be broken by a user. When the coils 42 are intact, they will indicate their presence in an interrogating RF field, each  
10 circuit being tuned to respond to a different RF frequency, and can be detected by the appropriate RF apparatus. The user enters information onto the device 60 by breaking the circuit portions 7 of a selection of the coils 42, which will then be detected by the absence of responses to particular frequencies of a suitable interrogatory field.

            Fig. 7 shows a printed circuit card 70 according to a sixth embodiment of the  
15 present invention. The card 70 comprises a substrate 5 and printed circuitry 71 having one or more circuit portions 7 arranged to be broken by the user. The circuit portions 7 in the embodiment are areas of conductive paint which may be removed by scratching by a user. The circuitry 71 further includes electrical contact areas 72, via which reader apparatus (not shown) is able to detect any broken circuit portions 7 using direct  
20 electrical contact and supplying a test signal via contact area 72a. Text legends 11 are printed on the card 70 near the circuitry 71.

            The card 70 may include a magnetic strip (not shown) for storage of data prior to the card being presented to the user. After the card is given to the user, they are able to input further information onto the card by breaking a selection of the circuit portions 7.  
25 Later, the user presents the card to the appropriate apparatus for reading the card. The reader apparatus may be, for example, a magnetic strip scanner which can download the pre-stored data. The reader apparatus additionally includes an array of electrical contacts which will directly contact areas 72 of the card and thereby detect which circuit portions 7 have been broken.

30            Whilst specific embodiments have been described to illustrate the present invention, it will be understood that various other combinations of features and arrangements are possible. For example, in the specific embodiments the circuit portions 7 are areas of conductive paint. However, a possible alternative for these would

be metal foil tags which are removable from the device by pulling, or snapping off, thereby breaking the electrical contact.

In the embodiments, the substrate is made of plastics, but it will be understood that any suitable non-electrically-conductive substance may be used instead.

5           A further embodiment might comprise a smart card (or simple chip card) of a similar arrangement to the card in Fig. 2, but which communicates with reader apparatus via either direct electrical contact, or infra-red or inductive methods instead of RF transmission.

10           It will be understood that whilst the user referred to in the specific embodiments is a human, this is not essential to the invention. The invention is also applicable in the case where the user is an automated machine designed for breaking the relevant circuit portions so as to input information onto a data input device.

15           It will be also understood that whilst the resonant circuit in the embodiments is a tuned coil, this is not essential to the invention. Any tuned circuit suitable for responding to an interrogatory electromagnetic field, and in which the response can be affected by the breakage of a circuit portion, can be used and will be known to those in the art. The resonant circuit could comprise a type which is responsive to more than one interrogatory RF frequency, such as described in US patent No. 3967161. In this type of circuit, the resonant properties will change from favouring one particular RF frequency to  
20   another when the appropriate portions of the circuitry are broken.

## CLAIMS

1. A data input device comprising electrical circuitry having one or more circuit portions arranged such that they are accessible to a user and can be broken by the user so as to store information on the device.
2. A device according to claim 1, further comprising a substrate, the circuit portions being arranged on the substrate and arranged to be broken by removal from the device by scratching.
3. A device according to claim 2, in which the one or more breakable circuit portions each comprise electrically conductive paint.
4. A device according to any preceding claim, further comprising processing means for detecting broken circuit portions.
5. A device according to any preceding claim, the circuitry further comprising a latch circuit portion arranged to be broken by a user so as to indicate to reader apparatus that information stored on the device by the broken circuit portions can be read.
6. A device according to claim 5 when dependent on claim 4, the processing means arranged to read information by detecting broken circuit portions only if the processing means first detects the latch circuit portion is broken.
7. A device according to any preceding claim, further comprising transmission means for transmitting the information to reader apparatus.
8. A device according to any preceding claim, the circuitry comprising a resonant circuit responsive to an electromagnetic field of one or more particular frequencies, the circuitry being arranged such that breaking one of the circuit portions will change the response of the resonant circuit to a particular frequency.
9. A device according to claim 8, wherein the resonant circuit comprises a substantially flat tuned coil.

10. A device according to claim 8 or 9, comprising a plurality of resonant circuits each responsive to a different electromagnetic field of one or more particular frequencies.

11. A device according to any preceding claim, further comprising electrical contact areas such that the information stored on the device by the user breaking one or more circuit portions can be read by a reader apparatus contacting the areas.

12. An information input system, comprising a data input device according to any of claims 1 to 11 and reader apparatus arranged for reading information stored on the device by a user breaking one or more of the circuit portions.

13. Reader apparatus arranged for reading information stored on a device according to any of claims 1 to 11 by a user breaking one or more of the circuit portions, the apparatus comprising means for detecting which of the circuit portions of the device have been broken.

14. Apparatus according to claim 13, wherein when the circuitry on the device comprises a latch circuit portion arranged to be broken by a user, the reader apparatus is further arranged to read information on the device by detecting broken circuit portions only when the reader apparatus first detects the latch circuit portion is broken.

15. Apparatus according to claim 13 or 14, further comprising means for detecting one or more broken circuit portions of the device by detecting the response of one or more resonant circuits of the device in an electromagnetic field.

16. A method of reading information stored on a device, the method comprising the step of detecting one or more circuit portions of electrical circuitry on the device which have been purposefully broken so as to store information on the device.

17. A method according to claim 16, in which the step of detecting the broken circuit portions is carried out by processing means on the device.

18. A method according to claim 16 or 17, in which circuitry of the device further comprises a latch circuit portion arranged to be broken by the user, and the step of detecting the broken circuit portions is only carried out after the step of detecting that the latch circuit portion is broken.

19. A method according to any of claims 16 to 18, in which the step of detecting one or more broken circuit portions comprises detecting the response of one or more resonant circuits in an electromagnetic field.

20. A method according to any of claims 16 to 19, further comprising the step of receiving the information via transmission from the device.

21. A method according to any of claims 16 to 20, comprising the step of providing electrical contact between reader apparatus and contact areas on the surface of the device.

22. A method of inputting information into a system, the method comprising the steps of:

providing to a user a data input device, the device comprising a substrate and electrical circuitry having one or more circuit portions arranged such that they are accessible to the user and can be broken by the user;

inputting information onto the device by the user breaking one or more circuit portions; and

reading the information on the device using the method according to any of claims 16 to 21.

23. A data input device substantially as hereinbefore described with reference to and/or substantially as illustrated in any one or any combination of the accompanying drawings.

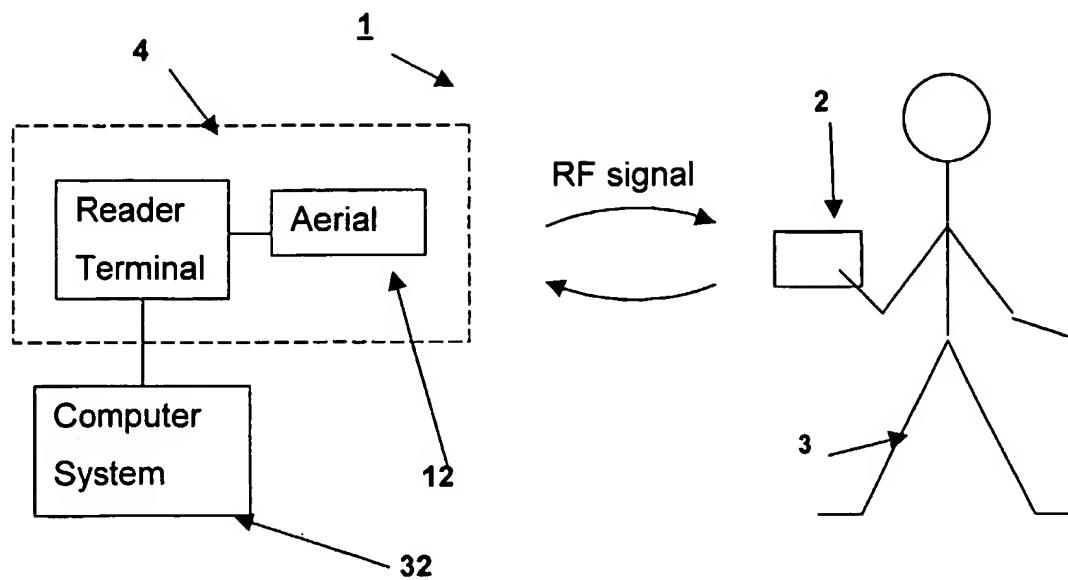
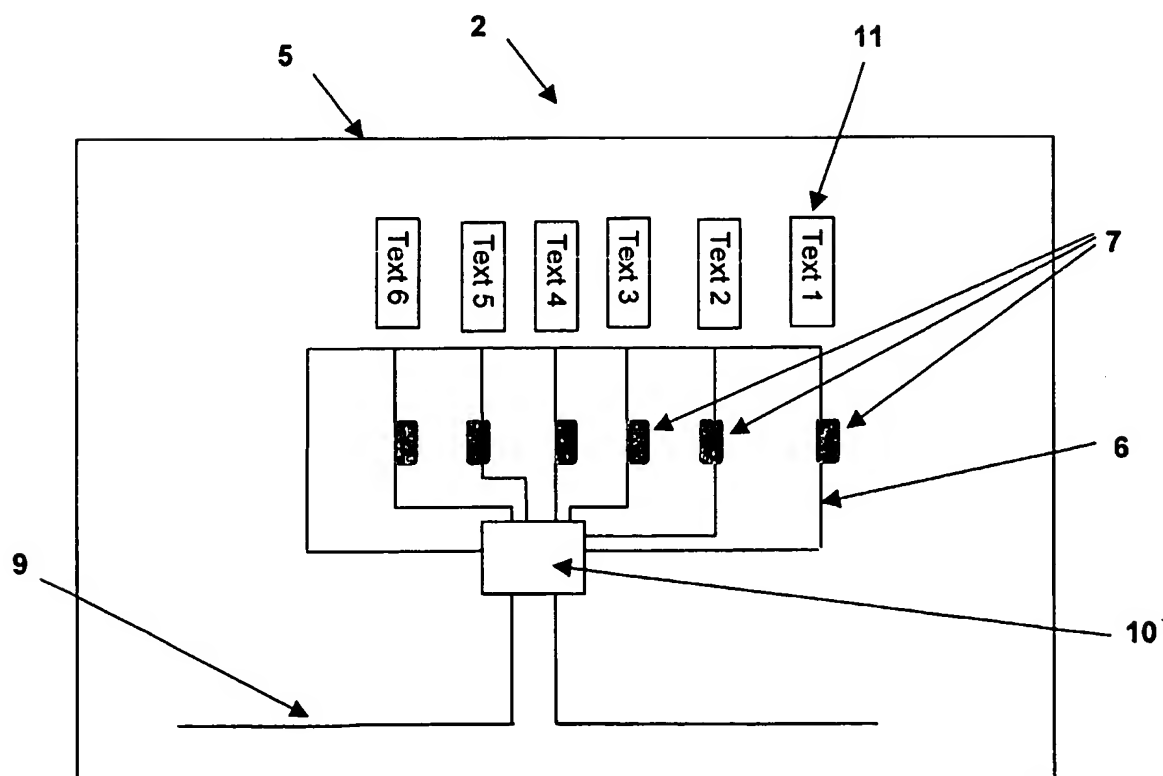
24. Reader apparatus substantially as hereinbefore described with reference to and/or substantially as illustrated in any one or any combination of the accompanying drawings.

25. A method of reading information substantially as hereinbefore described with reference to and/or substantially as illustrated in any one or any combination of the accompanying drawings.

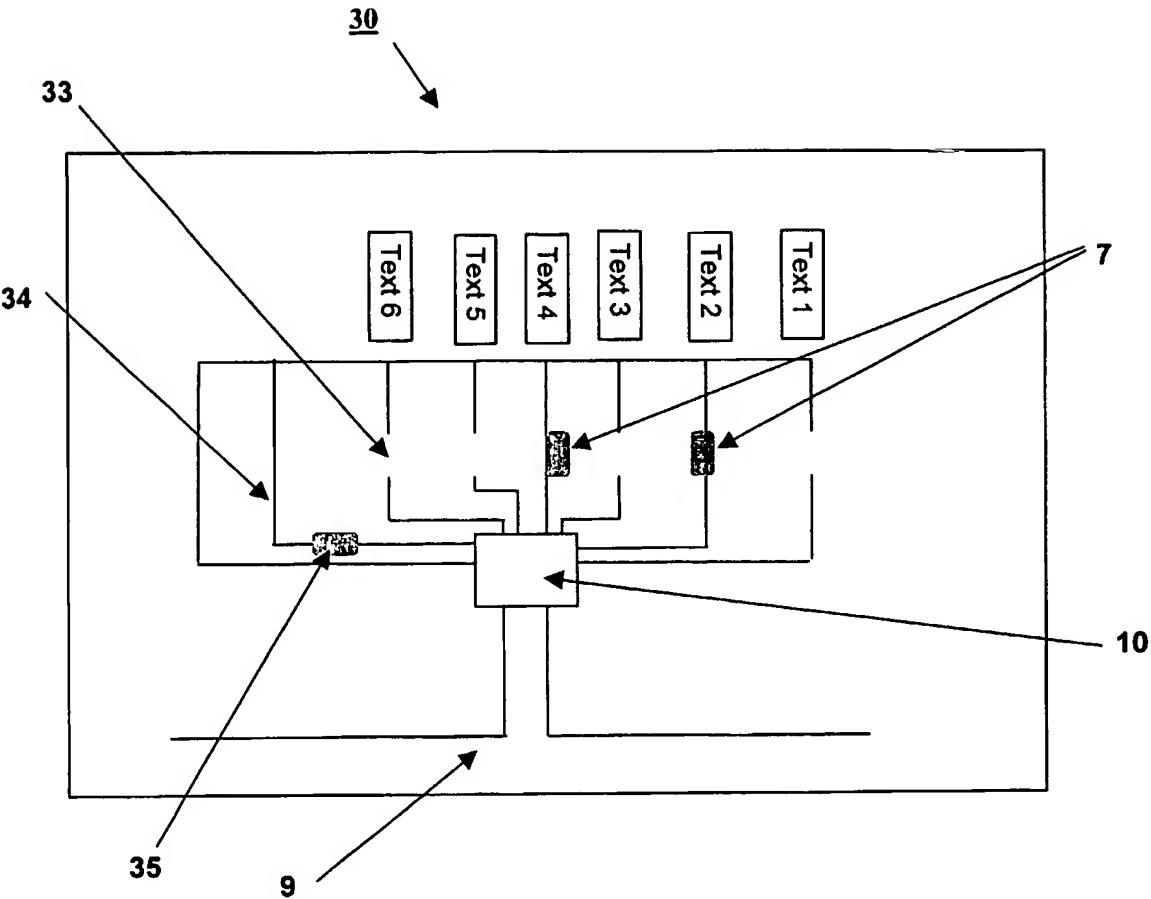
26. A method of inputting information substantially as hereinbefore described with reference to and/or substantially as illustrated in any one or any combination of the accompanying drawings.



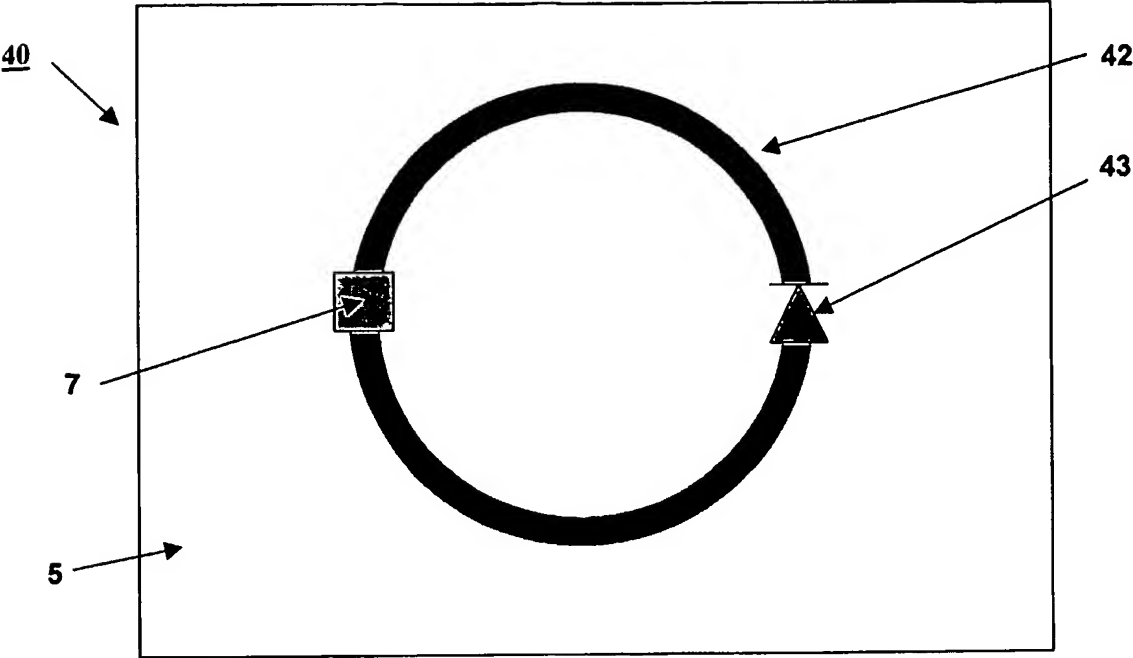
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**Fig. 1****Fig. 2**

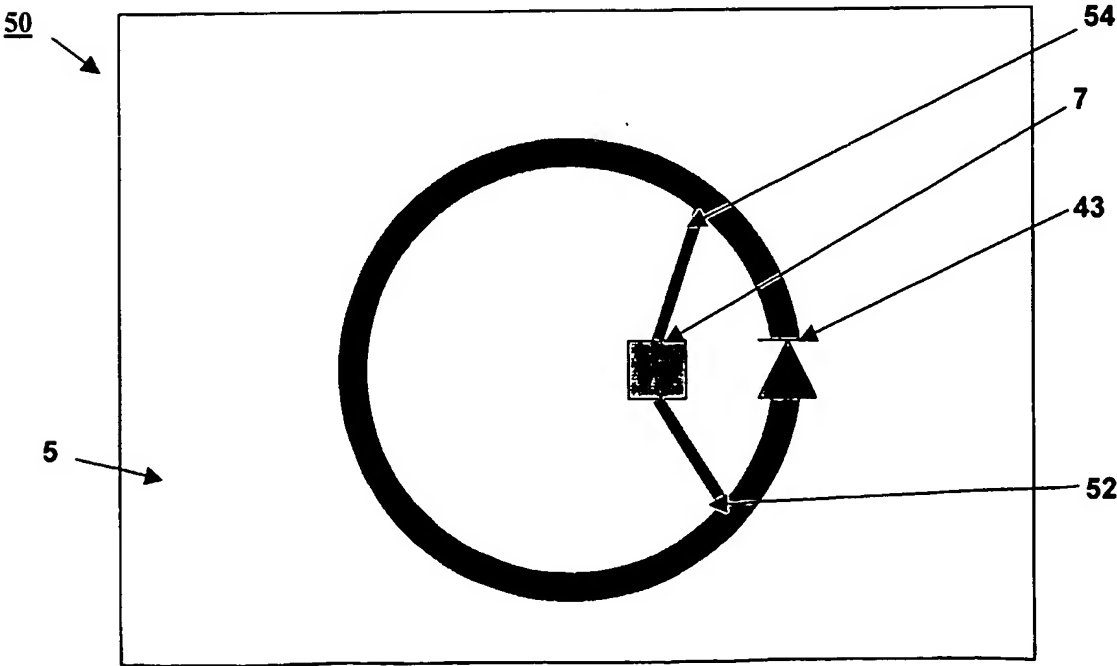
**Fig. 3**



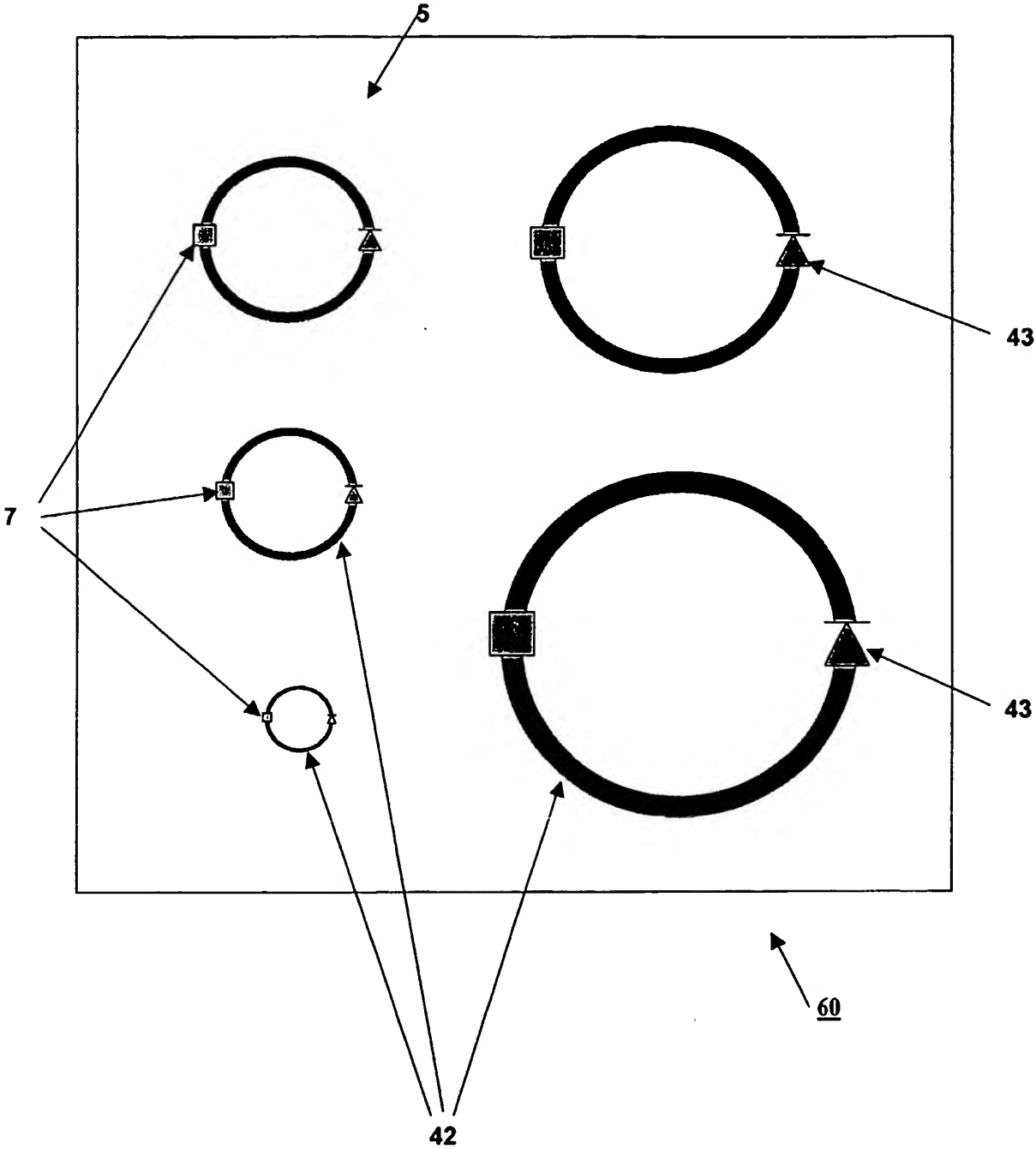
**Fig. 4**



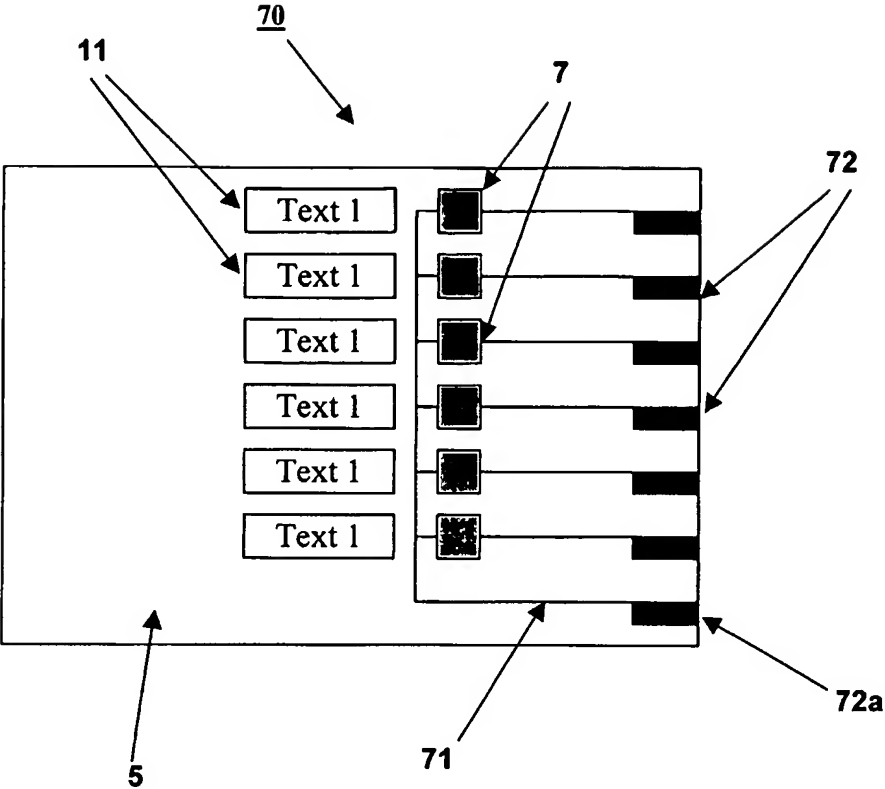
**Fig. 5**



**Fig. 6**



**Fig. 7**



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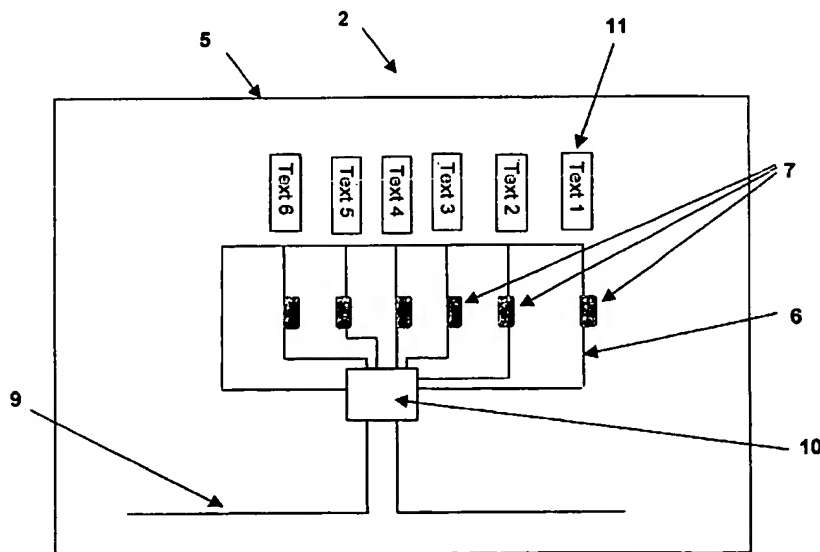
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(54) Title: A DATA INPUT DEVICE



(57) Abstract: A portable data input device (2) comprises a substrate (5) having electrical circuit portions (7) which can be broken by a user to enable information to be input onto the device. The information represented by the broken circuit portions can then be read using the appropriate reading apparatus. The device (2) might be a chip card, RFID (radio frequency identification) device, magnetic strip device or simple printed voucher, and can include text legends (11) printed on the device to indicate a number of choices to the user.

WO 2004/027689 A3



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/03932

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06K19/067 G06K19/07 G06K19/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 565 922 A (ANDERSON ERIC G) 21 January 1986 (1986-01-21)  column 2, line 64 -column 4, line 12; figures 1,3,4	1,7, 11-13, 16,17, 20-26
X	WO 97 15027 A (PHILIPS ELECTRONICS NV ;PHILIPS NORDEN AB (SE)) 24 April 1997 (1997-04-24)  page 3, line 25 -page 4, line 13; figure 1  -/--	1,4,7, 11-13, 16,17, 22-26

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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## INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 069 472 A (KAMATA SHOHICHI ET AL) 17 January 1978 (1978-01-17)  column 8, line 4-17; figure 7	1,7,8, 10,12, 13,15, 16,19, 20,22-26
X	US 3 816 711 A (BLISS W) 11 June 1974 (1974-06-11) column 3, line 6 -column 4, line 57	1,13,16, 22-26
X	US 5 599 046 A (BEHM WILLIAM F ET AL) 4 February 1997 (1997-02-04)  column 4, line 60 -column 7, line 59	1-3,12, 13,16, 22-26
A	EP 0 901 101 A (DAINIPPON PRINTING CO LTD) 10 March 1999 (1999-03-10) paragraphs '0016!', '0017!'	1,12,13, 16,22-26

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/03932

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4565922	A	21-01-1986	AU 2749584 A CA 1228920 A1 DE 3469964 D1 EP 0126333 A2 ZA 8403350 A	22-11-1984 03-11-1987 21-04-1988 28-11-1984 24-12-1984
WO 9715027	A	24-04-1997	EP 0800686 A1 WO 9715027 A1 JP 10511488 T US 5917178 A	15-10-1997 24-04-1997 04-11-1998 29-06-1999
US 4069472	A	17-01-1978	JP 1068943 C JP 53018109 A JP 56007190 B JP 1091180 C JP 52079685 A JP 56033675 B JP 1091181 C JP 52079686 A JP 56033676 B CA 1069606 A1 DE 2658669 A1 FR 2336837 A1 GB 1534750 A	23-10-1981 20-02-1978 16-02-1981 31-03-1982 04-07-1977 05-08-1981 31-03-1982 04-07-1977 05-08-1981 08-01-1980 07-07-1977 22-07-1977 06-12-1978
US 3816711	A	11-06-1974	NONE	
US 5599046	A	04-02-1997	AU 2947295 A WO 9535216 A1 US 6379742 B1 US 5997044 A	15-01-1996 28-12-1995 30-04-2002 07-12-1999
EP 0901101	A	10-03-1999	JP 11078323 A JP 11126245 A EP 0901101 A2 US 6073856 A	23-03-1999 11-05-1999 10-03-1999 13-06-2000